INTRODUCTION

The olive oil industry generates large quantities of by-products such as pomace, process water and leaves during the commonly used two-phase centrifugation system, representing a major disposal and potentially severe pollution problem for the industry. These residues could be a potent exploitable source of bioactive compounds and substances of high interest like natural phenolic antioxidants [1]. New extraction technologies, such as extraction assisted by microwaves, allow exploring the recovery of these compounds [2], which is a great challenge and an excellent opportunity for the olive oil sector.

This work aimed to evaluate the cytotoxicity, antiproliferative and antidiabetic effects of olive-based natural extracts. These extracts, developed under the scope of the Oil4Health project, were obtained through microwave-assisted extraction of olive pomace and leaves.

AIM

STRATEGY

Olive pomace

Microwave-assisted extraction

Olive pomace extract

Olive leaves

Microwave-assisted extraction

Olive leaves extract

BIOLOGICAL EVALUATION

Cytotoxicity

Antiproliferative activity

Antidiabetic activity

METHODS & RESULTS

CYTOTOXICITY

The cytotoxicity of the extracts was evaluated in confluent Caco-2 cells (model of human intestinal epithelium).

The extracts did not present cytotoxicity in Caco-2 cells for the tested concentrations (IC50 > 344 mg/L).

ANTIPROLIFERATIVE ACTIVITY

The antiproliferative effect was tested in a colorectal cancer cell line (HT29 cells).

The pomace extract (EC50 = 203.5 ± 41 mg/L) and the leaves extract (EC50 = 174.2 ± 30 mg/L) inhibited the proliferation of HT29 cells.

ANTIDIABETIC ACTIVITY

The antidiabetic properties of the extracts and reference compounds were tested in a rat pancreatic β-cell line expressing human insulin (INS-1 832/13).

The extract F15 significantly increased the fold-change of glucose-stimulated insulin secretion (GSIS) in response to glucose (hyperglycaemia/ normoglycaemia).

CONCLUSIONS

- The EC50 values were lower than IC50 values obtained for Caco-2 cells. At this concentration, the extracts lead to inhibit 50% of cancer cell proliferation with no cytotoxic effect in healthy cells (Caco-2 cells [3]), suggesting that the extracts have potential anticancer effect.

- Extract F15 improved pancreatic β-cell capacity to respond to hyperglycaemia suggesting its potential for the development of antidiabetic formulations.

REFERENCES